THE DENTAL PRACTITIONER

AND DENTAL RECORD

Including the official reports of the British Society of Periodontology, the British Society for the Study of Orthodontics, the European Orthodontic Society, the Glasgow Odontological Society, the Liverpool and District Odontological Society, the North Staffordshire Society of Dental Surgeons, the Odonto-chirurgical Society of Scotland, and the Dental and Medical Society for the Study of Hypnosis

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THE DENTAL PRACTITIONER
AND DENTAL RECORD

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EDITORIAL

ROMAN FORUM

NEXT month members of the dental profession from all over the world will congregate in the capital of Italy for the XIIth International Dental Congress. It is somewhat unlikely that the participants will indulge in a Roman holiday, but they will certainly be on a busman's holiday. Under the clear Mediterranean skies discussion and argument will take place on every conceivable aspect of dental surgery. The more debate and argument the better, for it is by these means and not by set lectures that we begin to understand and learn the underlying truth. The carefully prepared lecture delivered in exemplary style states the beliefs of the individual or group of individuals who have been asked to present the specific lecture. The mass may be easily swayed by oratory and the persuasive powers of the speaker, but a professional body should not allow itself to be hypnotized into a new line of thought. The substance of a lecture must be probed and given careful consideration before it may be accepted as a final truth. Question time after a lecture is in many ways more important than the lecture itself. This is the time to delve into the mind of the speaker to see if he has feet of clay. The lecturer must during this period prove his case to the satisfaction of his audience, which may be much more difficult than proving it to his own satisfaction. After the case has been ventilated it is then assessed. This in dentistry, as in all medicine, can be fraught with difficulties. Our lives are spent dealing with the ever-changing tissues of nature, a vast field of which is completely unknown. An assessment cannot obviously always be based on scientific fact, neither should it be valued purely on the strength of coincidence or statistics. Much of our knowledge is empiric and always will be, for our theory is not advanced sufficiently to formulate new concepts of treatment. There is, of course, nothing wrong with empiricism, but, being based on observation and experiment and not on proven theory, it must take into account the personal qualities of the observer and experimenter. This is why argument and debate are so essential, and question time becomes so important.

The Congress is being held in Rome amidst the magnificent ruins of the centre of the Roman Empire, a feature of which was the Forum. This was the public meeting place for discussion, argument, and debate. In wishing all success to the Congress let us remember the old Roman Forum and its use by the citizens of Rome. In resolving our problems in this fashion the ultimate good will encircle the world, taking with it the eternal hope that one day through these international meetings the scourge of dental disease will be eliminated.

TOOTH CONCUSSION

RADIOGRAPHIC OBSERVATIONS

By **SYDNEY BLACKMAN**, L.R.C.P., M.R.C.S., D.M.R.E.

Director, X-ray Department, Royal Dental Hospital, London

For a number of years, observation has been carried out in the X-ray Department of the Royal Dental Hospital, London, of the changes occurring in and around the apex of a tooth following upon an injury. In this particular review, the radiographic study is confined to teeth which were injured without fracture or dislocation.

Direct violence to a tooth causes a jarring or impaction of the tooth against the socket wall, thereby bruising the intervening periodontal membrane, in the majority of cases, at the very apex. The resultant injury depends largely upon the severity of the concussion and varies from the rupture of a few small capillaries to extravasation of blood and the formation of small hæmatomata in and around the apex of the tooth.

Resolution may take place without any radiographic signs of involvement of the periodontal membrane, and, with rapid absorption of any local extravasation of blood, no changes will be discerned in the periapical bone. If, however, there is any interference with the blood-supply to this area, definite and often permanent structural reactions can be demonstrated in the radiograph.

The following radiographic changes have been observed after concussion of a tooth:—

1. Changes in the periodontal membrane.
2. Hæmorrhagic complications.
3. Pulp reaction.
4. Developmental interference.
5. Resorption of the apex of the tooth.
6. Hypercementosis.
7. Bone reaction.
8. Ankylosis at the apex.
9. Superimposed infection.

1. Changes in the Periodontal Membrane. Traumatic Apical Periodontitis.—No injury to the mouth, however minor, should be disregarded, and the region should be radiographed as soon as possible. Apart from dislocation or fracture, the effects of an injury to a tooth may not be visible immediately and it is important that the tooth should be submitted to periodic clinical and X-ray examinations.

The soft connective tissue of the periodontal membrane does not cast a radiographic shadow, and is represented on the radiograph as a thin black line occupying the space between the lamina dura of the socket and the cementum of the root. The variations in the thickness of the periodontal membrane shadow are not always indicative of an active pathological change.

The black shadow is usually thicker around the teeth of the adolescent than in the older patient, wider at the apex than at the middle of the root, and thinner in the absence of opposing teeth and with the lessening of stress. In these days of increasing orthodontic treatment necessitating tooth traction and movement, changes occur in the apical periodontal membrane as a result of compression or widening due to axial stress.

The apical area of the periodontal membrane, in most instances, receives the full effect of concussion, and it is the irregularity, together with the thickening of the periodontal membrane shadow, which indicates the existence of a local inflammatory reaction (*Fig.* 1). The condition may remain unresolved and clinically symptomless, and in these cases the radiograph shows a blobbed or small beaded, irregular thickening around the apex of the tooth.

Only the effects of chronic traumatic apical periodontitis are seen on the radiograph and, unless there is a concurrent infection, the changes are confined to the apical thickening of the periodontal membrane, with no signs of erosion or a break in the continuity of the lamina dura or outer surface of the root. Nor is there any evidence of an attempt on the part of the alveolar bone to develop a

protective or reparative sclerosing osteitis outside the tooth-socket.

In the absence of dislocation or fracture of the tooth, the interpretation of an irregular thickening of the apical periodontal membrane shadow, after an injury, is simplified. With the previous existence of caries and pulp

Fig. 1.—Female, age 19 years. Traumatic apical periodontitis. Received an accidental blow six days ago. Crown of $\underline{1|}$ shows no evidence of caries or fracture. Slight thickening and irregularity of the apical periodontal membrane shadow.

involvement infection of a traumatic periodontitis is inevitable, and the final diagnosis is possible only after due assessment of the local clinical signs and symptoms.

2. Hæmorrhagic Complications.—The acute apical periodontitis following upon a direct blow on a tooth produces a cellular exudate into the tissue, dilatation of the smallest capillaries, and an increase in the permeability of the blood-vessels.

If the capillary vessels rupture, an extravasation of blood follows into the periodontal membrane at the apex. Unabsorbed blood at the apex may interfere with the normal blood-supply to the tooth and bring about a necrosis of the pulp.

With the formation of an apical hæmatoma, a definite irregular black area persists at this site (*Fig.* 2). The identification of an apical hæmatoma radiographically is an important step in the determination of the future of the injured tooth, which will probably lose its vitality and become prey to an added infection.

It is not unusual to observe in a routine radiograph a well-defined, circular, semi-radiolucent area in the bone beyond the apex,

Fig. 2.—Male, age 15 years. Apical hæmatoma. Received a closed-fisted punch on mouth about four weeks previously. Relatively large black area at apex of $\underline{|1}$.

Fig. 3.—Male, age 24 years. Encapsulated hæmatoma. Ran into a lamp-post about three months ago. Large circular black area, radiating from the apex of $\underline{1|}$ and overlying the apical half of the root and the bone beyond, with an equal radius. Tooth vital.

with no obvious signs of porosis of the bone beneath it. The condition is symptomless

and may be a thinly encapsulated hæmatoma which remains quiescent for many years, until it becames infected (*Fig.* 3).

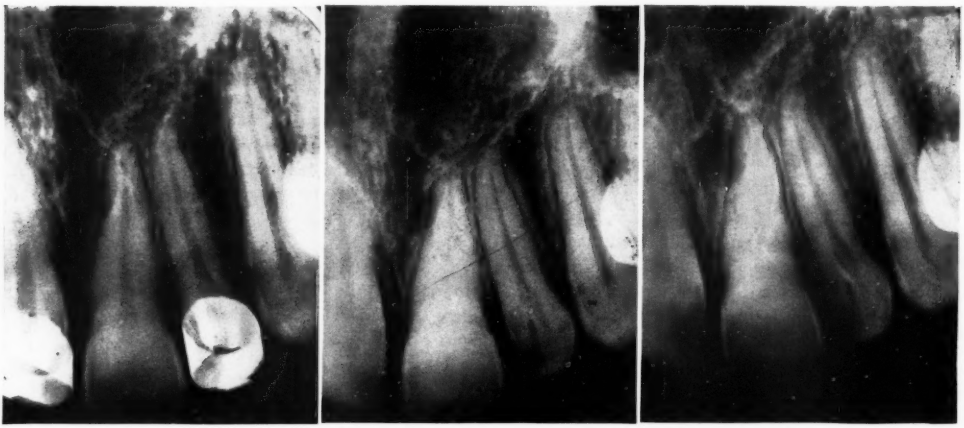
3. Pulp Reaction.—When the apical vessels supplying the pulp are involved in an injury ensues, there will be no radiographic signs at this primary stage. However, there are two important sequelæ to a traumatic pulpitis, although neither is common.

In the first instance, part or the whole of the pulp may calcify, but usually it is the apical part which is attacked (*Figs.* 4 and 5). The radiolucent canal is obliterated by an opaque pulpal deposit.

Secondly, necrosis of the pulp affects the growth of a tooth which is not fully formed (*Fig.* 6), and is seen on the radiograph as an attenuated undeveloped tooth, with an irregular-shaped root, and calcification of the terminal half of the pulp canal.

Fig. 4.—Male, age 43 years. Calcification of the pulp. Fall on the right lower jaw over three years ago. Obliteration of the apical half of the pulp canal of $\underline{4|}$.

4. Developmental Interference. — The developmental changes in a tooth following upon concussion are always due to vascular complications and may include both the partially erupted as well as the erupted tooth.



A B C

Fig. 5.—Calcification of the pulp in the upper left central incisor tooth following an injury at the age of 10 years and after orthodontic treatment for proclined upper incisors begun at the age of 11 years. A, Age 13 years, Feb. 4, 1954. Discoloration of tooth; diminished vitality. *Radiograph*: Negative. B, Age 14 years, Oct. 13, 1955. Further discoloration; diminishing response to E.C. *Radiograph*: Obliteration of pulp canal except apical third. C, Age 15 years, Aug. 14, 1956. Marked darkening; negative E.C. response. *Radiograph*: Complete obliteration of pulp canal.

to a tooth, there is always the danger that the circulation of blood to the tooth may be affected.

The circulation will stop immediately if there is a complete rupture of all the apical vessels, and although necrobiosis of the pulp

In the erupting and not fully formed tooth, a hæmatoma may form and remain at the extreme end of the tooth and prevent it from closing, leaving the tooth with a patent opening at the apex (*Fig.* 7). This condition may be unrecognized and discovered only

during a routine radiographic examination of the mouth or as a result of supervening infection.

Fig. 6.—Male, age 31 years. Calcification of the pulp with irregular-shaped tooth of $\underline{2}$. Fell off a round-about on to face at age of 9 years.

Fig. 7.—Male, age 27 years. Open apex with hæmatoma. Blow on face at 7 years of age. Was unaware of condition, except that the lateral incisor "never grew bigger". Developed a large painful swelling after an attack of inflammation of the gums, four weeks ago.

Fig. 8.—Another view of *Fig.* 7 showing the stunted growth of the lateral incisor.

Fig. 9.—Male, age 19 years. Dilacerated root. Received a blow on the mouth by a cricket bat at age of 10 years. $\underline{2}$.

In the cases where the apex has already closed, there may be signs of arrested growth and this can be seen in the form of an undeveloped tooth with an irregular-shaped root (*Fig.* 8), or even as a dilacerated root (*Fig.* 9). It should also be pointed out that a dilaceration may follow upon trauma to a deciduous predecessor to a permanent tooth germ, so that the apical part of the tooth forms at an angle to the forward part.

A hæmatoma may cause retardation in the rate of the eruption of a partially erupted tooth.

5. Resorption of the Apex of the Tooth.—It is not uncommon to find, radiographically, that one or more teeth show resorption of the root apex, and, in most instances, there is no sign of any concurrent dental disease and the general health of the patient appears good.

Fig. 10.—Girl, age 13 years. Apical resorption of $\underline{21}|$. Blunting of roots of $\underline{21}|$. Socket contracted down to enclose the shortened root. Fell on face a year ago. The two right upper incisors were loose for three months.

Although this condition is not common, 18 cases have been observed in the last 4 years, all between the ages of 11 and 20 years; there was a definite history of trauma in each case and the teeth affected were the upper incisors. There was no suggestion of either dislocation or fracture of the teeth as a result of the injuries.

There must have been severe concussion in these patients with resultant traumatic apical periodontitis. In such cases it might be reasonable to assume that an osteoclastic reaction has been promoted and so resorption of the apex may be regarded as one end-result of tooth injury (*Figs.* 10 and 11).

The radiograph reveals a uniform loss of dentine and cementum commencing at the apex and leaving a smooth convex or flattened surface at the end of the resorbed root. An interesting feature is that with the shortening of the root, the socket has contracted down to the size of the remaining tooth length, with the lamina dura at the apex neither thickened nor broken, but remaining continuous with the walls of the socket. The outer periapical bone shows no change in pattern.

6. Hypercementosis.—In contrast to apical resorption where the apex and root of a tooth

Fig. 11.—Male, age 18 years. Apical resorption of $\underline{1}|\underline{12}$. Trapeze artist. No actual injury, but his "act" included biting a metal bar during a swinging turn. Is now employed as a waiter.

are insidiously destroyed, radiographic examination may show quite unsuspectedly one or more teeth carrying an excessive deposition of cementum around the apex and terminal part of the root.

A review of patients with hypercementosis attending the X-ray Department at the Royal Dental Hospital, London, shows that there is a definite division between the generalized cases and the single tooth involved. In the former classification, there were attendant conditions, such as endocrine disturbances as hyperpituitarism, osteodystrophies as Paget's disease, vitamin A deficiencies, and two cases of gout.

In those cases where only one tooth was affected there was a history of some form of violence to the area of the jaw involved. Of the seven patients interrogated, each was insistent that there was no external bruising.

As a result of the injury, a low-grade infection probably takes place, attacking the

periodontal membrane between the inner wall of the socket at the apex and the outer surface of the terminal end of the root. Superficial erosion and resorption of the hard surface of the root ensue, and, concurrently, there is abnormal deposition of new cementum formation, confined in and around the apical part of the root.

Fig. 12.—Male, age 37 years. Hypercementosis. The patient is a professional boxer who has received innumerable blows on his lower right premolar tooth and has complained often of the jarring of the mouth shield between his teeth. Large overgrowth of the cementum around the distal part of the root $\overline{4}|$ within the socket. The lamina dura is adapted to the new formation and there is no reaction in the external bone. The appearance is suggestive of absorption of the apex before the laying down of the new cementum.

Radiographically, as the laying down of the cementum progresses, the extreme end of the root becomes thickened and bulbous, with no bridging across the periodontal membrane shadow or occlusion of this space. With the enlargement of the apical portion of the root, the socket becomes wider and more capacious, with the lamina dura adjusting itself to the new shape and contour of the root.

Fig. 13.—Male, age 41 years. Apical bone deposition. Always cracks the shells of nuts with his teeth and remembers falling a year ago on his face during such an operation. Was away from his work for three weeks because of pain in this tooth which was loose. New bone cluster formation around the apical socket. $\overline{3}|$.

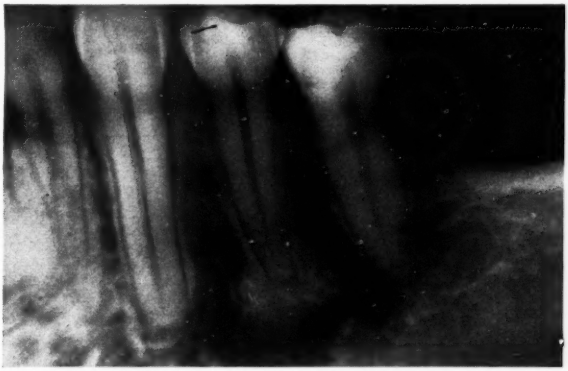


Fig. 14.—Male, age 31 years. Blow on this area of the face about eighteen months ago. The external bruising took nearly seven weeks to disappear. Homogenous sclerotic bone around the apex outside the socket. $\overline{|4}$.

There is no sclerotic bone reaction outside the socket and no alteration in thickness or condensation of the lamina dura.

7. Bone Reaction.—Occasionally, the radiograph will show a tooth with no sign of caries, nor of any fracture, but exhibiting new bone formation outside the socket and yet not encroaching upon the periodontal membrane shadow although located in the region of the apex. (*Fig.* 12.)

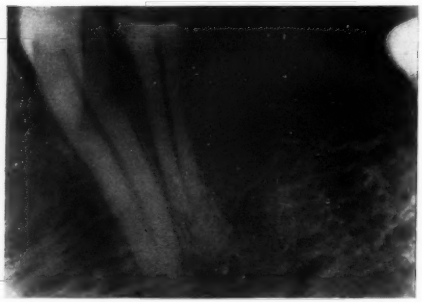


Fig. 15.—Female, age 30 years. Ankylosis of apex. Husband hit her accidentally with a golf club. Lower left second premolar was extracted as it was fractured one year ago. Obliteration of the periodontal membrane shadow around the apex. $\overline{|4}$.

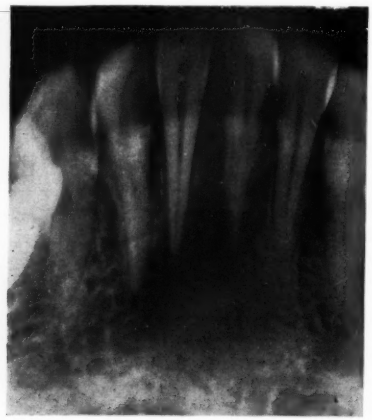


Fig. 16.—Male, age 18 years. Alveolo-dental abscess following an injury to the tooth. Hit by a cricket ball three weeks ago. Bone destruction extending from $\overline{1}$ to $\overline{|1}$ and centrifugally into the main bone.

In fourteen cases investigated, all were found in one single tooth in the mandible and each patient gave a clear and definite history of an injury or blow on the lower jaw, in no instance less than one year previously. The tooth involved was vital.

Radiographs (*Figs.* 13 and 14) show neither thickening nor irregularity of the periodontal membrane shadow around the apex nor any attempt at occlusion of the radiolucent space. The deposition of bone around the apex is seen to be laid down in different ways; either in cluster formation or as an homogeneous bone mass, similar to a cementoma. In neither of these cases is there a carious condition present, and it might be reasonable to suggest that this may be evidence of calcification and ossification in the extravasated blood outside the socket.

The new bone formation is different from the sclerotic deposition often noted in periapical disease, where there is thickening and irregularity of the lamina dura, together with irregular areas of dense bone outside the socket with signs of apical resorption.

Fig. 17.—Male, age 21 years. Blow on the mouth five months ago. Centrifugal spread of bone destruction to the alveolar margin. $\overline{|1}$.

8. Ankylosis between the Tooth and the Bone.—Bony ankylosis of a tooth is a relatively rare condition, but the radiographic appearances are characteristic (*Fig.* 15).

The main feature is the obliteration of the radiolucent line of the periodontal membrane. The adjoining alveolar bone shows no

radio-opacity or sclerosis and there is no line of demarcation between the cementum of the root and the trabeculated bone.

To bring about a coalescence of the root of the tooth to the socket wall the union must be composed of calcified tissue, and it can only bridge across the two hard structures if there has been an erosion or an initial resorption of their apposing surfaces. Although associated in most cases with an infective condition, it does occur as a result of trauma. The formation of granulation tissue within the membrane is succeeded by young connective-tissue cells from which osteoblasts form to lay down new bone.

As no mouth is actually free from some form of microbic infection, it is fair to assume that the bony ankylosis is secondary to an infective inflammatory condition, even though it be of a low grade and generally unrecognized. In such instances there are no signs of reaction outside the socket in the cancellous bone.

9. Superimposed Infection.—In the presence of marginal periodontitis or with a diseased tooth, it is inevitable for a traumatic apical periodontitis to be converted into an infective condition. The sequence of events in such circumstances follows the recognized destructive processes of an alveolo-dental abscess.

Commencing with a penetration and break in the lamina dura, there follows rarefaction of the supporting bone of the tooth. The next step is a spreading osteitis from a local destruction of the bone outside the socket with abscess formation. (*Figs.* 16, 17.)

Radiographically there is loss of the bone structure around the tooth, which may extend laterally to neighbouring teeth, centrifugally to the alveolar margin, or away from the apex into the main bone.

Acknowledgements.—My thanks are due to colleagues at the Royal Dental Hospital, London, who have kindly made available to me their patients for investigation, and to the staff of the Photographic Department for their excellent reproductions and prints.

BIBLIOGRAPHY

ANDERSON, B. C. (1944), *J. Amer. dent. Ass.*, **31**, 195.
Color Atlas of Oral Pathology (1956), Prepared under the auspices of the U.S. Navy Dental School of the National Navy Medical Center. Philadelphia: Lippincott.
HUTCHINSON, A. C. W. (1954), *Dental and Oral X-ray Diagnosis*. London: Livingstone.
MILES, A. E. W. (1947), *Brit. dent. J.*, **82**, 187.

TWO INVERTED TEETH IN THE MANDIBLE

By **CHARLES McKAY, M.D.S., L.D.S., Q.U. Belf.**

CASE REPORT

A WOMAN, aged 49 years, was referred to the Royal Victoria Hospital, Belfast, on November 16, 1955, complaining of a painful swelling in the right mandibular premolar region.

All her teeth had been extracted and full upper and lower dentures fitted 18 years previously. The patient stated that 32 teeth were removed, a few at a time, under local anæsthesia. New dentures were fitted 3 years previously. Nine weeks ago her jaw became painful under the lower denture on the right side. She attended her dentist, who discovered and removed a root in the premolar region. The pain disappeared within a few days but recurred two weeks ago.

ON EXAMINATION.—The patient was a small, thin, middle-aged woman who appeared healthy. She had a slight tender œdematous swelling extra-orally in the right mandibular premolar region, and a small bony prominence was palpable on the lower border of the mandible in the same area. On intra-oral examination she was found to be edentulous with considerable alveolar resorption and a small fragile mandible. There was a sinus on the alveolar crest in the $\overline{4}|$ region, and a soft tender area of inflammation in the adjacent buccal sulcus.

Radiographs (*Figs.* 1, 2) showed two inverted teeth lying in the body of the mandible in the $\overline{54}|$ region, the posterior tooth being in close proximity to the mental foramen. The crowns were separated from the lower border by a thin shell of bone. The root of the anterior tooth appeared to be incomplete. An occlusal view (*Fig.* 3) showed the buccolingual relationship.

It was decided to remove the teeth under general anæsthesia using the intra-oral approach and to utilize the dentures as splints in the event of a fracture of the mandible. Under endotracheal anæsthesia an incision was made along the alveolar ridge and a buccal mucoperiosteal flap elevated. The mandible was exposed as far as the lower border, care being taken to avoid injury to the structures emerging from the mental foramen. The outer cortical plate was removed, using numbers 8 and 10 rose-head burs in a dental handpiece under a

continuous saline jet. The teeth were removed and the sockets curetted. The inferior dental nerve and blood-vessels could be seen in the resultant cavity. The flap was replaced and sutured.

Healing was satisfactory and the slight resultant anæsthesia of the lower lip disappeared after three or four days.

Fig. 1.—Lateral oblique radiograph showing two inverted teeth in the $\overline{54|}$ region.

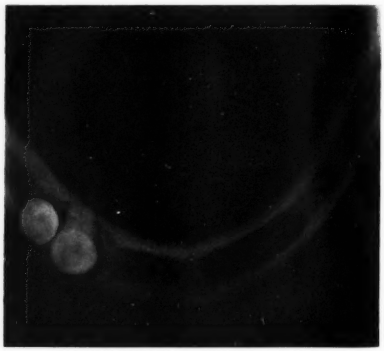


Fig. 3.—Occlusal view showing the bucco-lingual relationship.

DISCUSSION

It has not been possible to confirm the patient's statement that 32 teeth were extracted, but it seems likely that the inverted teeth were supernumeraries. They were of bicuspid type but unusually small, the posterior one, which was intact, measuring 12 mm. long. The root apex of the anterior tooth was missing, apparently having been removed by the patient's own dentist nine weeks previously. In spite of their small size the teeth occupied almost the whole depth and width of the mandible in this region (*Figs.* 1 and 3).

The condition appears to be very rare as references to it in the literature are sparse, and no other case of two inverted teeth has been traced. Stones (1951) mentions a case

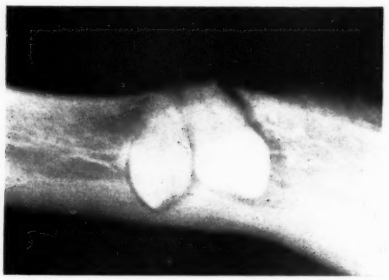


Fig. 2.—Intra-oral radiograph of $\overline{54|}$ region.

of inverted mandibular second premolar and states that the condition is extremely rare. Other cases have been reported by Macallister (1954) and Willcocks (1955). A case of inverted maxillary premolar has been reported by Campbell (1917).

My thanks are due to Professor P. J. Stoy for permission to report this case.

REFERENCES

CAMPBELL, J. M. (1917), *Brit. dent. J.*, **38**, 363.
MACALLISTER, A. D. (1954), *Austr. J. of Dent.*, **57**, 5.
STONES, H. H. (1951), *Oral and Dental Diseases*. Edinburgh: Livingstone.
WILLCOCKS, R. W. (1955), *Brit. dent. J.*, **98**, 4.

Tyrothricin Dentifrice

Significant reductions in caries incidence have been shown to occur in both hamsters and children when a tooth-paste containing 0·05 per cent tyrothricin and insoluble sodium metaphosphate has been used. After two years the incidence of new decayed and filled permanent tooth surfaces was reduced by 26 per cent by brushing with the antibiotic paste compared with the controls. The author considers this to be a highly significant result. —SHIERE, F. R. (1957), *J. dent. Res.*, **36**, 237.

PARTIAL DENTURES AND THE RESTORATION OF MASTICATORY EFFICIENCY*

By **JOHN FARRELL**, M.D.S., L.D.S. R.C.S.
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It is sometimes difficult to know when partial dentures are necessary. Patients who have had a few posterior teeth extracted often ask whether the loss should be made good by artificial means in case it results in poor digestion, and if a small loss of chewing surface is the only reason for making dentures the question may be very hard to answer. This is the difficulty—common in any dental practice—that I want to discuss by relating it to the value of mastication in promoting digestion.

Many partial dentures do more harm than good. We are all familiar with the damage that may be done by the sort of denture that the National Health Service can afford to subsidize, and it is this that may make it hard to decide whether a patient who has lost a small amount of occlusal area needs prosthetic treatment to restore masticatory efficiency or whether he will be better off without it. Decisions on these border-line cases are not easy because it is necessary to balance the harm and the good that partial dentures may do. Estimating the possible damage is usually relatively simple, having in mind the type of dentures that can be made and the patient's oral hygiene, to name only two factors, and I do not propose to discuss this side of the problem except in the most general terms; it is the other part of the question that is most likely to cause difficulty when we have to advise our patients whether to have dentures fitted, because here we have to assess the masticatory efficiency and the very important question of the value of mastication.

We should also consider the use that people are prepared to make of their teeth. Mr. Gladstone is supposed to have chewed each mouthful forty times before committing it finally to the digestive process, and this is, of course, no isolated example. On the other hand it is common to see people who hardly masticate at all, however efficient their dentitions may be in theory. Chewing habits are largely a matter of temperament and it is therefore not surprising that they vary so much, and, in doing so, complicate our treatment planning.

A similar problem faces the dental branches of the Armed Forces and others who may have to set a standard of dental fitness of any occupation. This was emphasized in the Boer War when mincing machines had to be issued to units whose soldiers were unable to chew the meat provided. We do not know which was at fault, the teeth or the rations, but if the soldiers were right in maintaining that it was the meat the incident serves to illustrate another facet of our problem—that in estimating the value of a dentition and deciding if it needs artificial assistance we must consider whether the work that it has to do is greater than the normal.

If, therefore, we are to find a reasonable and practical method of assessing the value of a dentition and deciding whether artificial replacement of a few lost posterior teeth is necessary, we must consider the following factors:—(1) The value of mastication. (2) Individual chewing habits. (3) Special cases where the need for mastication may be greater than normal.

THE VALUE OF MASTICATION

Much valuable work has been done on the question of masticatory efficiency. As is well known, a test material such as roasted peanuts is chewed in some standard way and the resulting particles are sieved, usually in a 10-mesh screen, so that the proportions of chewed material passing through and remaining in the sieve can be estimated. In this way a percentage figure for the masticatory efficiency is produced, a high figure denoting that a large proportion of the test material was chewed finely enough to pass through. A very full

* A paper read before the British Society of Periodontology at the Eastman Dental Clinic, March 18, 1957.

report on a series of these tests was made by Dahlberg (1942) and the figures for various dentitions, ranging from complete to mutilated, were published. Similar reports have been made, both before and since, by other workers.

Can these tests help us to know when it is desirable to replace lost teeth artificially? If their results could be made into a sort of dental ready-reckoner it would certainly simplify the problem, but, unfortunately, the tests themselves cannot easily be related to it because the ability to triturate peanuts may not be a good guide to the capacity of a dentition to comminute fibrous, less brittle, and more important foods such as meat; and we also have to consider whether very fine comminution of food is really necessary to digestion.

The changes that have taken place since man's earliest days in methods of food preparation and in the foods themselves are considerable; indeed an evolutionary substitution of our normal complement of teeth by a tin-opener might not, if present trends continue, be so very surprising. Most, although not all of these changes seem likely to have resulted in an increased digestibility, and it is therefore reasonable to consider whether mastication is, in modern conditions, as necessary to digestion as we might think.

It is true that the increase of surface area that results from chewing assists digestion, but the point which is really at issue here is whether the stomach and small intestine *need* such assistance; whether, helped by the alteration in the nature of our food, they can digest it easily and fully in the time available without such thorough comminution as has been assumed to be necessary, or even perhaps—for some foods—without any mastication at all.

This is, in fact, the case. From the results of an investigation, already reported in detail in other journals (Farrell, 1956), I have been able to prove that there is a wide variation in the digestibilities of different foods, and that while some mastication is necessary for complete digestion of certain foods, others will be utilized fully even when they are swallowed without chewing.

Briefly, the method used in the experiments was to sew weighed portions of chewed and unchewed food into separate cotton-mesh bags, join these together, swallow them, and later collect them from the fæces for estimation of their contents, again by weighing. Thirty foods have been tested for the effect that mastication has on their digestibility, ten separate experiments being carried out for each food. Of these thirty foods, nineteen were shown to need at least some chewing if digestion is to be complete; these are the lean meats and the vegetables. The lean meats are of course very important nutritionally, and it was interesting to find that large undigested residues (of up to 87 per cent) may be left by unchewed beef, mutton, pork, liver, and bacon. The effect that the method of food preparation has on digestibility is striking, and it has been possible to show that certain "tenderising" methods increase the utilization of meat. A further investigation has shown that steak is less digestible when fried than it is when raw. Some meats, such as stewed lamb and roast chicken, are more digestible than others, but may still be only partially digested unless they are chewed.

Of the vegetables, unchewed specimens from garden peas, carrots, or potatoes (whether old or new, boiled or fried) left very substantial undigested residues, in some cases of 100 per cent, so that the difficulty cannot be evaded by going without meat and becoming a vegetarian. The evidence as to the nature of these vegetable residues was less clear cut than it was with the meats, which could be shown to be completely undigested by histological means, but starch estimations for potato residues indicate that some chemical breakdown had taken place, even though the physical structure remained intact. Digestion was, however, incomplete as 50–60 per cent unaltered starch was found in the residues. Mineral estimations were unhelpful as interchanges occur during passage through the gut.

From a purely dental point of view the important fact is that all these meats and vegetables need to be chewed if they are to be digested fully. In other words, chewing *is* necessary, at least for some foods. The list of foods which are easily digested even if swallowed unchewed is quite long—meat fat,

all forms of fish whether boiled or fried, hard-boiled egg, rice, bread, and cheese—and it contains items which are of great nutritional importance; but while lean meats and vegetables continue to be eaten, teeth, and therefore dentists, will continue to be necessary.

This fortunate finding is important, but it is not sufficient, by itself, to answer our main question—when to replace a few lost posterior teeth and when not to. For this, we need to know the *degree* of food comminution necessary for maximum utilization of food, and how many occluding teeth are needed to produce it.

Further experiments, using the method already described, were carried out to determine this, and the results showed that the amount of chewing necessary for complete digestion of the least digestible lean meat—fried pork—was surprisingly small. In one series of experiments where a subject chewed with and without his partial dentures there were no significant differences in the utilization of the food despite the fact that when chewing without the dentures he was only using two occluding molars and his masticatory efficiency, measured by a standard peanut test, was 37 per cent instead of 55 per cent with the dentures; indeed, what differences there were showed better digestion after the subject had chewed without his dentures, but these arose by chance and were not statistically significant. In another series the results were even more striking. Here the specimens were chewed, by a different subject, either by a full complement of posterior teeth, or using the incisors only. The masticatory efficiencies for these two conditions were 89 per cent and 23 per cent, yet despite this very large fall in theoretical efficiency both methods of chewing gave the same result—complete digestion. It was also found that a subject chewing with full dentures was able to masticate sufficiently to digest as well as any of nine other subjects who were chewing with natural teeth.

It would be wrong, however, to say that two occluding molars or twelve front teeth are enough, because the degree of comminution achieved must to some extent depend upon the size of each mouthful, which, experimentally, had necessarily to be small. Further work is in progress to test this effect, but it is probably slight unless the size of a mouthful is such as to violate good manners. We should, however, bear the point in mind when interpreting the results of the experiments.

Even so, we can certainly say that the loss of as many as six occluding posterior teeth *need* make no difference to the patient's masticatory efficiency in the only practical sense that really matters, provided, of course, the remaining teeth are in satisfactory occlusion and the chewing habits reasonably good. If more teeth than this are missing it may still be possible for the patient to chew well enough without artificial assistance, but as the number of lost teeth increases the effect of the patient's chewing habits becomes more and more important, and it is certainly necessary for greater attention to be paid to this.

INDIVIDUAL CHEWING HABITS

Dahlberg (1942) found that the number of chews given to each mouthful of food tends to stay the same throughout life, and not be increased because of declines in the effectiveness of dentitions due to loss of teeth. This is a most important finding, because although it is obvious from the results of the experiments on digestibility that compensation for loss of occlusal area is possible, even though many teeth may be missing, Dahlberg's work showed that such compensation does not generally take place.

It is more likely that a person who has suffered a decline in masticatory efficiency will attempt to compensate by forgoing "difficult" foods, but the choice of these is usually based more on difficulty of chewing than of digestion. In any case such voluntary action is, understandably, normally taken only when many teeth have been lost, and is not common among patients who, because their loss is not so large, present the greater problem when we have to decide whether dentures are needed.

Since chewing habits are unlikely to be modified in changed conditions, it becomes more than ever necessary to take account of them in diagnosis and treatment planning. The wide variation that exists in these habits

is too well known to need emphasis, but its natural consequences in causing a similar variation in the need of different individuals for replacement of lost teeth do not often appear to receive practical attention. Yet whenever it is at all difficult to decide whether or not to fit partial dentures, consideration of this factor may well supply the answer, because a patient who is accustomed to chew thoroughly will compensate for a loss of occlusal area which would be harmful to a person who is in the habit of eating at speed.

There is another point which must receive attention when chewing habits are being considered. Most people use one side of the mouth more than the other even if no teeth are missing, so that if teeth have been lost on one side only the effect on masticatory efficiency may be so slight as to be negligible. If the preferred side, whichever it may be, becomes inefficient for any reason it takes only a few days for this habit to change, and the other side to be used. The speed with which this change-over takes place is the more surprising since we know that other chewing habits rarely change at all. The effect, however, is to enable many patients to compensate for considerable unilateral losses of teeth, without the provision of partial dentures.

These are not factors that anyone should try to classify, or make rules about. All that is necessary is that a patient whose chewing habits enable him to compensate for the teeth he has lost should not be made to wear a partial denture unless it can be made to a non-harmful design, or is needed for other reasons, such as restoration of appearance, periodontal splinting, or to bring functionless teeth into occlusion; and that the greater need for occlusal area of a person who is in the habit of chewing inefficiently should not go unsupplied.

SPECIAL CASES WHERE THE NEED FOR MASTICATION MAY BE GREATER THAN NORMAL

The effects of poor mastication are not necessarily limited to incomplete digestion, and it is possible that it is one of the factors which can cause gastritis, gastric or duodenal ulceration, and even gastric carcinoma. While there is no direct evidence of this, and although there are many examples of these conditions in patients who chew well, the possibility must be recognized. However, mastication which is sufficient for digestion is very unlikely, in the absence of other predisposing factors, to *cause* these conditions.

Where they are already present special measures may become necessary to raise the masticatory efficiency above the level required by healthy patients, and because we have no evidence of the degree of food comminution which is needed to prevent further irritation of inflamed or diseased alimentary mucous membrane a high standard must be set. Partial dentures which replace only two teeth may therefore be needed by patients who suffer from gastro-intestinal disease particularly if they are not in the habit of chewing thoroughly, for it is as essential to make certain of the patient's ability to masticate effectively as it is to eliminate dental infective foci.

There is little more that need be said of such difficulties as caused the War Office to issue mincing machines during the Boer War. The Services now have their own standards of dental fitness well formulated, and, in any case, "hard tack" is rare nowadays; in fact it was recently reported in the press that it was left out of the rations for the British Antarctic Expedition on dental advice. In civilian dental practice in this country it is very uncommon for such problems to arise, and when they do they can be judged on their merits.

OTHER FUNCTIONS OF MASTICATION

The preparation of food for digestion is not, of course, the only function of chewing, although it is the most important. Mastication also prepares food for swallowing (indeed this is its main purpose in carnivores), assists taste and smell, protects against the ingestion of harmful substances, contributes to the health of periodontal tissues and, in children, assists the growth of the jaws by exercising the muscles of mastication.

It is not, however, necessary to consider this formidable list when deciding whether or

not to fit partial dentures, because mastication which is sufficient for digestion will also satisfy these other requirements.

CONCLUSIONS

In our answer to this problem of when to replace lost natural posterior teeth by partial dentures we must distinguish between the needs for occlusal area in health and in disease of the alimentary tract. When patients are suffering from gastro-intestinal disease it would obviously be wrong to risk further injury to the alimentary mucosæ by the ingestion of coarse, incompletely masticated food. The present lack of evidence of the effect of poor mastication on these diseases should be interpreted, in cases of doubt, as a reason for providing partial dentures.

In health, however, when the adequacy of a dentition is in question the main considerations must be, first, whether it is possible for the patient to chew well enough to digest, and, second, whether he will actually do so. The number of occluding teeth needed to satisfy the first requirement would be quite small if it was not for the fact that many people do not bother to chew, and, conversely, the importance of chewing habits would be less if everyone had a good set of teeth.

These two factors are so interdependent and their variability so great that it is impossible to make hard-and-fast rules about their effect on the need for partial dentures. Such rules are not, however, necessary and each case should be judged on its merits, remembering always the damage that the ordinary run of partial dentures may do to the periodontal tissues, and the possibility that they may be the first step on the slippery slope which leads to full dentures.

The main function of teeth is to make mastication possible, and the primary purpose of mastication is to assist digestion. The effect of loss of teeth on masticatory efficiency, and the effect of masticatory efficiency on digestibility are therefore matters of vital importance in dentistry. They are, in fact, the very basis of the major part of our work and, perhaps because of that, are sometimes taken for granted. This applies particularly to the effect of mastication on digestion, and much of the research into masticatory efficiency—although valuable and very detailed—has been limited to what happens in the mouth.

As a safeguard against over-specialization, we teach that the mouth should be looked at "as a whole". It is also necessary to remember that the mouth itself is only a small specialized part of a large and complex structure, and that it is possible, in designing dental treatment, to fail to see the broad principle for the detail.

REFERENCES

DAHLBERG, B. (1942), *Acta Med. scand.*, Suppl. 139.
FARRELL, J. (1956), *Brit. dent. J.*, **100**, 149; *Brit. J. Nutrit.*, **10**, 111; *Proc. physiol. Soc.*, July, 15.

DISCUSSION

Dr. D. J. Anderson in opening the discussion said that Mr. Farrell's experiments were of great value because they showed that full restoration of the dentition was unnecessary from the point of view of the digestive function of mastication. He went on, however, to point out that there was more to mastication than could be estimated in this way, and mentioned its role in stimulating gastric secretion, the satisfaction it gave, and so on. Although digestion could occur without preliminary preparation of the food in the mouth it might well be that this put a strain on the alimentary tract which would not show in a short series of experiments. Dr. Anderson concluded by congratulating Mr. Farrell on his ingenious and important work.

Replying to Dr. Anderson, Mr. Farrell said that the pleasurable part of eating was not necessarily the chewing. Because of the variation in chewing habits it was dangerous to generalize, but very palatable substances were often swallowed quickly, the pleasure being gained more from the swallowing, and the taking in of another mouthful, than from mastication.

Antibiotics for the Prevention of Bacteræmia following Oral Surgery

An investigation into bacteræmia following tooth extraction shows the value of adequate pre-operative dosage of an antibiotic. In this case terramycin was the drug of choice. The results showed that the number of positive blood-cultures was higher when a larger number of teeth were extracted. The incidence of bacteræmia was markedly reduced in patients who had taken oral terramycin three hours pre-operatively.—COOLEY, F. H., and HABERMAN, S. (1957), *J. dent. Res.*, **36**, 294.

TEMPORARY FIXED SPLINTS

By **C. C. KNOWLES**, B.D.S., D.D.O., and **E. D. FARMER**, M.A., M.D.S., F.D.S. R.C.S. (Eng.)
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TEMPORARY splinting of one or more teeth is often a necessary adjunct to successful periodontal treatment. Interdental wiring with brass or stainless steel wire has been described by many, including Sorrin (1945), Simring (1952), and Trott (1955). Although this method has value, the wires often require adjustment to give good stability, they are not easily applied to posterior teeth because of the shape of the crowns, and they are not always simple to clean. The type of splint described below using orthodontic band material, and mentioned by Sorrin (1945) and Simring (1952), has been shown to give good stability for up to six months; it is easy to clean and can be used on posterior teeth.

Fig. 1.—Splint made to immobilize $\underline{|1}$.

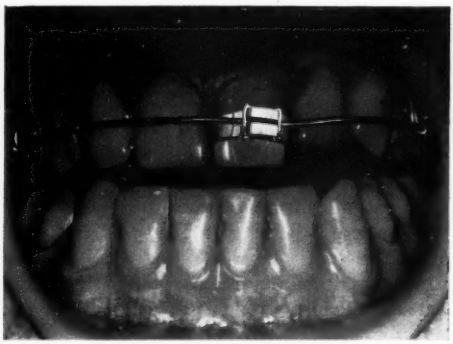

Fig. 2.—Splinting of $\underline{|1}$ using a labial arch wire with bands on $\underline{4|4}$.

The tooth to be immobilized and one or more of the stable teeth on each side are banded, using stainless steel tape 0·08 mm. thick by 2·5 mm. broad. Should the affected tooth be loose or painful, its band can be made for the corresponding tooth on the opposite side and then transferred. The bands should be made a sliding, not a loose, fit and where possible they should be positioned on the middle third of the crowns of the teeth. The intention is to make the bands so that they can be withdrawn from the teeth in an alginate impression as it is often difficult to seat incisor bands accurately in an impression after withdrawal. On the working model cast in stone with the bands in situ, stainless steel strip 0·2 mm. thick by 2 mm. broad is adapted to the labial surface of the bands and soldered into place. Solder is then flowed in between the teeth from the lingual aspect, making the splint rigid, but not bulky. After polishing the splint may then be cemented into place (*Fig.* 1).

In an emergency a splint of this type can be made directly in the mouth without using a working model. The teeth are banded as described and correct registration of the connecting strip on the bands can be achieved by careful marking in the mouth, and by welding each band in turn at one place only in the first instance. The single weld acts as a pivot upon which to rotate the bands should they not be alined correctly. When correct alinement has been achieved, the splint is then made more rigid with solder.

Friedman (1953) pointed out that where teeth are in close contact they must be separated to allow two thicknesses of band material between them. In many cases involving the incisor teeth, however, this objection can be overcome by staggering the bands.

An alternative type of splint may be made by attaching a labial arch wire to bands on the posterior teeth (*Fig.* 2). This arch wire is adapted to fit into a twin arch channel welded to the band fitted to the tooth to be immobilized. Ligatures passed around the arch wire and through the twin arch channel hold the tooth firmly in place. This type of splint has also been successfully employed to stabilize a replanted upper incisor.

REFERENCES

FRIEDMAN, M. (1953), *J. Periodont.*, **24**, 229.
SIMRING, M. (1952), *J. Amer. dent. Ass.*, **45**, 402.
SORRIN, S. (1945), *Amer. J. Orthodont.*, **31**, 354.
TROTT, J. R. (1955), *Dent. Practit.*, **6**, 32.

ABSTRACTS FROM OTHER JOURNALS

Effect of Zinc Phosphate Cement Fillings on Gingival Tissues

Findings based on the insertion of zinc phosphate cement fillings in three monkeys and a dog, in cavities prepared to the bottom of the gingival crevice, showed that a more or less normal epithelial cuff can be formed against the filling material in limited areas. Only a slight chemical irritation was observed.

Bacterial plaques, however, formed on the surface of the cement filling and an inflammatory reaction due to this factor ensued in the adjacent gingival tissue. The action of the zinc phosphate was summarized as being more irritant than heat-cured acrylic resin, but less than self-cured acrylic resin. Crevices were observed at the margins of the restoration, being filled with debris and degenerating cells, and it was concluded that insertion of a restoration completely free from any such marginal defects was extremely difficult. Overhanging edges did not seem to act as chemical irritants. —WAERHAUG, J. (1956), *J. Periodont.*, **27**, 284.

Histological Results of Root Curettage of Human Teeth

Eighteen teeth were subjected to curettage with Gracey and McCall curettes prior to extraction. Six of these teeth were treated only to the extent of calculus removal, whilst the remaining twelve were curetted to plane the root surfaces after removal of the calculus.

Study was then made with a dissecting microscope and subsequently with an ordinary microscope of histological sections. After scaling alone, calculus remained on some surfaces of all six teeth and on a few surfaces superficial layers of cementum had been curetted, but the root surfaces were usually rough. After thorough planing with a curette, calculus removal was complete on all surfaces of 11 teeth, but on the remaining 1 some calculus was still present in an irregularity on the surface of the cementum. Subgingivally, cementum removal was complete in half of the total area treated, but where cementum remained it was very thin and felt smooth and hard to both curette and explorer. Where dentine was exposed, it, too, felt smooth and hard. By touch alone it was impossible to determine whether one was curetting cementum or dentine, thereby making it impracticable to remove one-third of the cementum as recommended by some authors.—SCHAFFER, E. M. (1956), *J. Periodont.*, **27**, 296.

Antibiotic Therapy

The routine use of antibiotics in dental practice in the absence of a clearly defined need cannot be too strongly deprecated. Definite indications for antibiotic therapy are few—examples are as follows:—

a. Patients with rheumatic or congenital heart disease.

b. Prevention of secondary osteomyelitis.

c. Accidental entry into the maxillary sinus.

d. Clearing of gross local oral infections prior to operative procedures.

The possible untoward effects brought about by antibiotics include (*a*) acute anaphylactic toxic reaction; (*b*) allergic reactions; (*c*) the development of antibiotic-resistant strains of organisms.—LANE, S. L. (1956), *Oral Surg.*, **9**, 52.

REPORT ON A VISIT TO THE UNITED STATES AND CANADA*

By **W. J. TULLEY**, B.D.S., F.D.S. R.C.S., D.Orth. R.C.S.
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THROUGH the generosity of the Newland Pedley Trustees I was able to make a three-month visit to twelve Dental Schools in the United States and Canada during the spring of 1956. There were important centres in this vast continent which I was unable to visit in the time, but I was present at the Annual Meeting of the American Association of Orthodontists in Boston attended by nearly 1200 delegates. Therefore I was able to meet many of the men whom I had not had the opportunity of seeing in their home schools.

Following Pringle's example I propose to divide this report into Orthodontic Teaching, Research, and Clinical Practice.

TEACHING

Previous visitors to the U.S.A. have reported that although the undergraduate dental students usually attend a full course of lectures and possibly a technique course, nowhere did they have the opportunity of carrying out active orthodontic treatment in the same way as in some schools in this country. The position has changed somewhat in the last few years.

At the University of Illinois in Chicago, where I spent the first three weeks, the influence of Edward H. Angle is probably the strongest. This was the first school to establish a graduate course leading to a degree. The undergraduate students have a very comprehensive series of lectures, but they do no clinical work on patients. The accent is on the Graduate course, which consists of six consecutive quarters of full-time work including intensive seminars in the basic sciences. The fixed appliance therapy taught here is confined almost exclusively to the edgewise technique; very few cases are treated by extraction. Dr. Brodie believes that if one method is taught thoroughly the student is best equipped to tackle any type of malocclusion. The headcap or cervical strap used with a fixed upper bow and bite plate is used in the early cases of Class II division 1 malocclusions and is referred to as "guiding treatment", usually being followed where necessary by full treatment.

At the Northwestern University, under Dr. Thompson, the undergraduates do little clinical work, but they have lectures and tutorials from Dr. Thompson, Dr. Graber, and the instructors. There is a strong accent on the anatomy and physiology of the temporomandibular joint. Here again, the graduate side receives the main emphasis and the edgewise, twin-wire, and labio-lingual techniques are taught.

In Ann Arbor at the Dental School of the University of Michigan there is an active Undergraduate teaching programme. The undergraduates spend a certain proportion of their time in the Orthodontic Clinic and handle a large number of cases. Like all of us who attempt this, they are having their problems. They have a large graduate programme requiring partial duplication of staff. The problem is to find suitable cases for undergraduates to treat and complete. All post-graduates prefer not to work on partially finished cases. This undergraduate programme means that fairly extensive use is made of removable appliances, reflecting the influence of Harvold when he was there.

In Toronto there is also a part-time undergraduate orthodontic programme. This is limited to relatively simple procedures, but provides the student with the basis of general practitioner orthodontics. In the graduate school a full range of fixed-appliance techniques is taught by different members of the staff on a part-time basis.

In Montreal I visited the French-speaking University and found a most enthusiastic group of graduate students under the direction of Professor Geoffrion, who attends part-time

* A paper read at the meeting of the British Society for the Study of Orthodontics held on Dec. 10, 1956.

at the School. The twin-wire was the fixed appliance receiving the main emphasis and Professor Geoffrion has just published a book on this subject. Many removable appliances are used incorporating the modified Arrowhead Clasp.

The Department has fine physical facilities. I noticed that there was a very high standard of photography. In this school the undergraduates have lectures and are taught simple preventive measures and treatment of the less difficult cases. A novel point about this school is that drawing and painting are stressed during pre-clinical studies and each student has to show a real proficiency in this before proceeding to clinical work.

I was unable to assess the teaching at McGill, the English-speaking University, as they were just taking over new premises.

At Boston, the Harvard School of Dental Medicine, there was no full-time graduate programme but a very active Undergraduate programme on a part-time basis. I sat in on a seminar on a Saturday morning where undergraduate students were presenting cases and was most impressed with their grasp of the subject. They extend this part-time course over their clinical period.

At Tufts, under Professor Margolis, the accent is mostly on graduate teaching and here the appliance therapy is mainly edgewise, using the Tweed technique. The undergraduates have an opportunity for a limited amount of clinical experience apart from a full course of lectures.

The Forsyth Dental Infirmary for Children is of course not an undergraduate teaching school nor is it a Graduate School in the strictest sense. Appointments here, however, give the Fellows opportunities for clinical work under the direction of Dr. Moorrees and I found a variety of appliances being used, including many removable.

Therefore, I believe that there is a definite increase in undergraduate teaching and in some schools this approaches or passes the undergraduate facilities in this country. Basically, however, the graduate programmes dominate the picture and enable a thorough training to be available to a large number of students. Many of these students work for a Master's degree by thesis in addition to the diploma for the completion of the course.

Most schools provide a part-time course for postgraduates, with the aim of keeping them abreast of current views and appliance techniques. Some of these courses are designed for the general practitioner. The University of Illinois has taken the telephone course to its logical conclusion by providing a closed-circuit television course in various subjects, of which one is Orthodontics. This can be relayed on closed circuit to five cities as far apart as Minneapolis and Indianapolis. Practitioners at each University centre are able to see close-up practical demonstrations.

RESEARCH

I was privileged to attend the Alumni meeting of the graduates of the University of Illinois during my first four days in Chicago. This meeting was attended by a large number of the Alumni, including the heads of five departments of teaching schools in the States. Professor Wilton Krogman and Dr. Holly Broadbent were present as Honorary Members. At this meeting, apart from many interesting papers from senior men, I heard summaries of the theses presented for the M.S. degree since 1951.

One must remember in reading the publications of these theses that the material is often limited and the objective a small one. It is an excellent idea for graduate students to undertake projects of this kind. Unfortunately, however, few of them will go on to teaching appointments where their research abilities can be continued. I think we should read with caution some of their findings in the early stages of this work.

Dr. Thurow gave a most erudite paper on cephalometrics at this meeting, in which he made this very point. He criticized the methods of superimposition of serial X-rays and the small amount of material statistically analysed.

Despite the criticisms that have been made concerning the use of the cephalometer in diagnosis it must be agreed that it is an excellent research tool in longitudinal growth

studies and I was privileged to spend two weeks with Dr. Holly Broadbent in the Bolton Foundation, where I was instructed in the use of the Bolton cephalometer which Charles Bolton has munificently donated to Guy's. Dr. Broadbent spent a considerable amount of time with me and I was permitted to select material from the unique files of the Bolton Study for a small research project.

This was in connexion with patterns of facial growth in Class II cases. With the limited time at my disposal I was able to trace a series of untreated Class II division 1 cases, and I was particularly interested to observe changes in axial inclinations of the incisor teeth as they erupt. This material will form a paper in itself.

One thing that is emerging from all cephalometric studies, particularly in relation to Class II cases, is the phrase "growth potential". Brodie still holds the view that the pattern of growth of the basal elements of the jaws is not influenced by orthodontic treatment, but he points out that it is the growth potential which we find difficult to assess. Where we get a considerable improvement in our Class II cases, it is the growth potential of that individual which is probably the major factor. There has been much too literal an interpretation of the statement that the skeletal pattern cannot change.

I think cephalometric research will in time settle down to a number of long-term studies which will continue to yield valuable material with the steadying influence of more senior men and the criticism that is being offered.

Under cephalometrics I should include laminagraphy and the excellent work that Ricketts and others have done. Special mention should be made of this work in connexion with the temporo-mandibular joint and in analysing paths of closure in Class II cases before and after treatment.

At the end of the Alumni meeting in Chicago, Brodie forecast that the research tool that would come to the fore in the next few years was the electromyograph. There is no doubt that there is an ever-increasing interest in the relationship between the soft-tissue activities and malocclusions. There are many investigators who are using the electromyograph in research projects and I made it my particular business to meet most of them. In Chicago, at the University of Illinois, Pruzansky and some of the graduate students are doing very interesting work; Perry and others at the Northwestern; and Jarabak at Loyola. Moyers, who was the first to use it as a dental research tool, is continuing his work at Ann Arbor.

There is a particularly active series of investigators at the University of Toronto Dental School and I was able to discuss problems with Dr. Basmajian in the Anatomy Department, who has spent some time with Bauwens in this country.

Most of this aspect of orthodontic research is directed to muscles of mastication and the postural muscles of the head and neck, and we can look forward to many publications in the future.

In assessing the importance of this work one is conscious that many investigators are not entirely satisfied with their techniques. I had lengthy discussions concerning the type of equipment, electrodes, the placing of electrodes, and particularly the interpretation of the results. I do not propose to say much on this subject, but I had some discussion with Dr. Sicher, who speaks his mind quite forcibly and points out that without clinical interpretation all that the electromyograph shows is that a muscle is contracting. It does not interpret its action. It may be a prime mover or an antagonist.

I still think that workers in this field have a long way to go. Moyers claims more for this apparatus than others. Pruzansky I found cautious and critical of technique. He has hesitated so far to publish more than a general paper on the applications of this to orthodontic research. I would criticize the placing of a so-called reference electrode over the sixth vertebræ or the ear and one on the muscle to be examined. In the case of the post-temporal, if you ask the patient to give a most retrusive bite, you get contraction of not only the posterior fibres of the temporalis but also of the post-cervical muscles. If you place your hand on the back of your neck and make a forced retrusive bite you can feel this happening.

This point was made to me by Pruzansky and Peary.

An unpublished thesis by Boyko in Toronto makes an exhaustive appraisal of different electrode positions in studying the temporalis muscle. He has shown that the posterior fibres may be just as active in closing movements in some Class I cases as in some Class II, division 1 cases by using different techniques. This is in addition to those Class II cases that have a forward posture at rest and therefore naturally show excessive contraction of posterior temporalis on closure.

With regard to the circumoral musculature, Karau and others, in theses presented at the Northwestern University, have made a study of normal and abnormal circumoral forces. Unfortunately like most of these graduate theses, the time and material have been limited but the ideas are worth following. Most of the instruments used for electromyographic analysis were adapted electro-encephalograms with crystographic recording apparatus. The most satisfactory equipment I found was used in the Anatomy Department at Toronto. This was an English product, incorporating six channels with oscillographic recording.

There are a number of workers using strain gauges and other methods of measuring intra-oral pressures. Last year Dr. Anderson reviewed the work on masticatory forces, but one piece of work that has received special attention this year is the prize-winning essay of the American Association of Orthodontists by Winders, recently published in full in the *American Journal of Orthodontics*. This is a very neat piece of research work and I only hope that despite his entering practice he will have the opportunity to continue. His preliminary findings would seem to some people not to tie up with our views on muscular behaviour, implying that his results agree with Sicher's views that the peri-oral and lingual musculature does not exert much influence on the positioning of the teeth. In his summary Winders says that "the results of this investigation indicate that there is an apparent imbalance of muscular forces acting on the dentition between the lingual and the buccal sides, with the greater force being exerted by the tongue".

I have spoken to him personally and he is the first to admit the limitations of his experiments to date. They were conducted on seven cases having ideal occlusions. I suspect that he will discover, as we are now finding, that it is the absence or presence of positive tongue pressures which is the important factor in moulding the incisor segments of the dental arches, and when a large series of cases is investigated by his method, although there may not be any measurable pressures from the cheeks, there certainly are cases which indicate excessive contraction of the lips. In the last paragraph of his paper Winders says: "to appraise definitely the effect that muscular forces have on the dentition, and the degree of this effect, would be a problem which could be clarified only through extensive, well-co-ordinated investigations".

I was privileged, through the kind introduction of Dr. Salzmann, to read a paper at the Association's Annual Meeting and I attempted to distinguish between what the Americans describe as muscle habits and the more basic atypical behaviour. There is still a tendency to overemphasize the value of muscle exercises in treatment.

Interest was shown in the work of Rix, Gwynne-Evans, Ballard, and others in this country who have been studying these problems. I quoted Angle's statement in the seventh edition of his book (1907). This is what he said: "We are just beginning to realize how common and varied are the vicious habits of the lips and tongue, how powerful and persistent they are in causing and maintaining malocclusion, how difficult they are to overcome.

"The period of retention of the teeth after they have been moved into normal occlusion is one of the most important in treatment and so complicated and persistent are the delicate forces that tend to derangement of the established occlusion as to necessitate the most thoughtful consideration of the problems involved and a degree of skill in overcoming them which much experience alone can develop, even among those with talent for the work." I pointed out that Angle would not face up to the immutability of soft tissues in some cases.

I found particular interest shown by Professor Bloomer, Professor of Speech Therapy in the University of Ann Arbor, in our problems of oromuscular behaviour. He was cognizant of all the work that had been published in this country and had come to similar conclusions regarding the underlying abnormalities associated with tongue/lip posture. I was able to show his student Speech Therapists the film which Gwynne-Evans and I showed before the Society last year.

At the Boston meeting Dr. Herbert Cooper showed a most interesting cine-fluorographic film using image intensification, just published in the *American Journal of Orthodontics*. This was particularly used in relation to cleft-palate cases, but there is no doubt that there is a future in this for the study of soft-tissue behaviour although there are a number of technical difficulties.

I had the good fortune to meet Dr. Sillman, who was reading a paper at the American Association of Orthodontists' meeting. I was able to see the continuation of the series of models that were shown over here by film nine years ago. Serial studies are also proceeding with models in the Institute of Human Biology at the University of Michigan and some of the graduate students here are examining this material.

Tucked away in the small town of Burlington, 60 miles from Toronto, I found a most interesting research unit attached to the University of Toronto Dental School under the direction of Frank Popovitch. This was initiated by Moyers while he was in Toronto.

In this investigation 300 children are being treated by simple methods using removable appliances. A so-called control group of more than 1000 children are being kept under observation with serial models and lateral skull radiographs. Initially they tried to use the electromyograph, but its use as a routine investigation has been discontinued. A short write-up of this can be found in the *Canadian Dental Journal* and I am sure we will hear more from this study in due course. Apart from the Director, there is a geneticist, three orthodontists, two pedodontists, a secretary, and two technicians on a part-time basis.

At the Forsyth Dental Infirmary material has already been published by Moorrees from the Stuart Study incorporating skeletal maturation and dental development, and there is considerably more material available here. There is also a vast series of models of untreated children in Honolulu which were supplied by Dr. Hoey. Unfortunately, the registration of the bite in some cases is difficult; otherwise this would have provided an excellent study of natural improvement or deterioration over a long period of time.

This section on Research would not be complete without mentioning the many centres where the cleft-palate problem is being enthusiastically tackled. At the Illinois school, Pruzansky has an infant cephalometer and at the Northwestern they are just installing a special high-voltage X-ray equipment capable of an exposure of a fiftieth of a second for infant skull X-rays.

CLINICAL PRACTICE

In discussing clinical practice it is unnecessary for me to say that multi-band techniques form a greater part of the armamentarium and treatment tends to be started in teenagers. It was not possible in the time available to study one technique in great detail and you will be hearing details of the latest edgewise methods from Halden in February, 1957.

I was privileged to spend some time with a number of leading orthodontists in their offices and one could never fail to be impressed by the speed with which whole mouths are "strapped up". I did notice, however, that considerable use is made of round wire before final adjustment is made with true edgewise arch. Twin brackets had been produced which some people are using instead of the single bracket and two staples in effecting rotation.

Apart from multi-band techniques there is a tendency to use the headcap with Hawley bite plate as an early approach to the treatment of Class II, division 1 cases.

The return to the use of cervical and occipital traction is received with mixed views in various parts of the States. Despite

criticism of the problems of anchorage in the lower arch with intermaxillary traction, the labio-lingual technique is still used by many orthodontists and I was privileged to spend some time in private offices in Boston where it is used exclusively. Here I saw models of the original case first treated by Dr. Lawrence Baker with intermaxillary elastics.

Cephalometric analysis still plays a prominent part in diagnosis, particularly for the younger man who is taught one of the rather empirical methods of case analysis according to his particular school. However, many of the older men do not use it as a diagnostic tool in the same rigid way. Dr. Holly Broadbent is a firm believer in assessing growth potential by examining a series of pictures, both lateral and frontal, taken at intervals before active treatment is commenced.

The purely mechanistic approach is losing its intensity and the problems of soft-tissue interference are being noticed more and more. I have pointed out that research is tending towards investigation of soft-tissue behaviour.

There is still controversy between the extractionists and the non-extractionists. One could not fail to be impressed by the results obtained with the edgewise arch in some of these non-extraction cases and their stability.

Serial extraction techniques are becoming more popular and two papers were read on this subject during my time in the States. Where appliance therapy is required it is, however, usually continued with partial use of the multi-band technique. Dr. Dewel of Evanston gave a paper on this subject at the E.O.S. meeting in Stockholm.

While attending the Boston meeting of the A.A.O. one could not help commenting on the display of equipment by the various companies. So many things are pre-formed that the multi-band technique is not as time-consuming as it is in this country.

There is certainly an increase in the use of removable appliances. I mentioned this in discussing the teaching, but I am certain that they will never be used as universally as in this country unless a large Public Health scheme comes into operation. Another definite trend I feel is towards more treatment in the mixed dentition and this is advocated by many leading authorities.

The Hawley bite-plate is being constructed by many people in their offices without technicians using the quick-curing technique. I have seen these made up between patients. They seem to stand up quite well to wear and there does not appear to be any reaction of the mucosa to free monomer. A removable appliance may be used in conjunction with molar bands in cases of Class II traction to attempt to stabilize the anchorage in the lower arch by closely applying the acrylic to all the teeth.

Additions of palatal springs to removable appliances were shown in the postgraduate courses given at the University of Illinois, and wherever there is a definite European influence one sees occasional use of the activator in the office. The positioner, which is made of rubber, is also being used not only as a retainer but for some active tooth movements.

As I mentioned in discussing Research, the cleft-palate problem in orthodontics is receiving considerable attention at the moment. These cases are being treated by a variety of methods from the edgewise arch to simple removable apparatus. In some instances there is considerable assistance in these projects from the State, but in Canada at Montreal I found a number of practitioners giving up part of their time to this treatment on a purely honorary basis. I am not sure that too much is being made of the number of people required to express an opinion on each case. These include a psychologist, a social worker, an orthodontist, a pedodontist, a pediatrician, a speech therapist, a plastic surgeon, and an E.N.T. surgeon. I believe that after a time a team of three clinicians can really assess these cases properly although consultation must be available with the others. There is a great tendency to attempt to delay the surgical closure of the soft palate until 5 to 6 years of age, but this is bound to be a controversial point, as it is in this

country. Most of these Cleft Palate Clinics have or are acquiring extremely good physical facilities.

I have tried to give a general appraisal of my impressions of this visit and time does not permit me to elaborate. I made so many friends and received so much kindness and hospitality that I cannot possibly make reference to everybody. If I have been somewhat critical of certain things, I must point out how much I admire their industry and ideals and their intense interest in the subject. There are bound to be differences of opinion in orthodontic viewpoints and I hope I have played some small part in bridging the gap between our different ways of thinking. I hope in the future that there will be a steady interchange of visitors between our two countries.

To summarize my impressions:—

1. There is definitely an increase of undergraduate orthodontic training.

2. Very full graduate programmes are given at most schools, covering anything up to two years' full-time study.

3. Cephalometric research is still active but it is no longer quite so dominant as a diagnostic tool.

4. There is an ever-increasing interest in soft-tissue behaviour, as shown by the number of workers in the field of electromyography.

5. There is a slight increase in the use of removable appliances.

Acknowledgements.—My thanks are due to the Dental Council of Guy's Hospital Dental School for the grant which enabled me to make this visit; to all my many friends in the United States and Canada who made me so welcome and helped me in so many ways; to Mrs. Rawlins who has prepared the X-ray tracings for photographing; and to Miss Whiteley for the preparation of the slides.

THE ROLE OF ORTHODONTICS IN PERIODONTAL TREATMENT

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It has been generally accepted that the aetiology of periodontal diseases is multiple. There is usually more than one aetiological factor involved in each periodontal case. The most common cause is lack of oral hygiene, which results in irritating supragingival and subgingival deposits. Malalinement of the teeth is also held responsible as an important contributory factor in a large number of cases. Furthermore, migration of teeth, deep overbite, and other kinds of malocclusion which sometimes result from periodontal diseases will aggravate the disease. Hence the role of orthodontics in periodontal treatment; as Dummett (1951) states: "The correction of various forms of malocclusion contributory to periodontal disease, and the elimination of such symptoms as migration of teeth, are the most outstanding areas in which orthodontic treatment is essential." Shapiro (1956) believes that many periodontal patients are given a poor prognosis because of the malalinement of the teeth, and all orthodontic conditions involved must be corrected for successful periodontal therapy.

Much has been said in the literature concerning the effect and treatment of malocclusion in periodontal patients, but, from our own observations, very little has been applied in practice. It is possible that the differences

in opinions regarding the age for commencement in orthodontic treatment may be the cause of the delay, for it was generally believed, until comparatively recently, that orthodontic treatment was not possible or practicable in patients beyond twenty-one years of age. Some orthodontists, moreover, seem to be hesitant to start treating patients with periodontal diseases because of the amount of periodontal tissue destruction, no matter how adequately the condition has been controlled. In fact, every orthodontist knows very well that only a delicate force, within physiological limits, should be used to move the teeth or necrosis will occur, resulting in a cessation of the desired movement. It is our own experience that the weaker the periodontal tissues the less force required. The movement of the teeth will be easier and much more rapid. Before the start of orthodontic treatment, all irritations and aetiological factors of periodontal diseases should, of course, be removed and the tissues restored to a healthy condition.

After the completion of orthodontic treatment, a splint for retaining the teeth is sometimes necessary. It may be fixed or removable, temporary or permanent. The fixed permanent is considered to be the ideal for most periodontal patients, but, unfortunately, this is not always possible. The patient's occlusion should be re-checked before the preparation of teeth for the splint. It is our opinion that the occlusion should be examined after the orthodontic treatment is completed, whether or not the patient has any periodontal disease. Coleman (1948) has recommended the application of selective grinding in orthodontic treatment: "We could probably eliminate the possibility of injury brought about by traumatogenic occlusion and procure, in addition, better retention by a more ideal functional occlusion." Glickman (1953) also believes it is essential to check the cuspal relationship of the teeth in function after the orthodontic treatment is completed, because incorrect cuspal relationships not only jeopardize the stability of the occlusion, but, in addition, are sources of injury to the periodontium.

A perusal of some fifty articles in the English language over the last thirty-five years concerning malocclusion in periodontology reveals that, in the main, isolated cases have been reported in which orthodontic treatment has been included—no detailed study or analysis of a number of cases, followed up over a period of time, has been presented. Such a study constitutes the main purpose of the present article.

According to Scopp and Bien (1952), there are three general forms of correction of malocclusion in the treatment of periodontal diseases:—

1. Correction of malocclusion through reshaping of the teeth by the periodontist.
2. Correction of malocclusion through the use of finger springs, inclined planes, or other appliances by the periodontist with orthodontic consultation.
3. Correction of malocclusion by the orthodontist through use of classical orthodontic appliances.

All the cases presented in this article were treated under the second and third headings. All cases treated under the first heading have been excluded as it is our main purpose to present only the results of orthodontic treatment by means of appliances in periodontal diseases. The cases presented are periodontal patients in the Eastman Dental Hospital, Institute of Dental Surgery, under the care of both periodontal and orthodontic departments. Of the 20 cases treated, 80 per cent (16 cases) were females and 20 per cent (4 cases) were males. The ages varied from 21 to 53 with an average of 34·6. They were treated during the period 1949–55. The periodontal diseases present initially were:—

	Cases
Chronic marginal gingivitis	3
Chronic localized periodontitis	1
Chronic generalized periodontitis	15
Periodontosis	1

The orthodontic treatment required ranged from the simple movement of an individual tooth into correct alinement to the movement of many teeth by means of multi-band fixed appliances. It is noteworthy that fixed appliances were only used in three cases.

Adult patients are frequently averse to these from æsthetic considerations, and very often a removable appliance is entirely satisfactory.

The reasons for orthodontic treatment in the cases of gingivitis were usually a cross-bite, or one or more instanding teeth, predisposing to food stagnation and difficulties in maintenance of oral hygiene. The case of periodontosis required orthodontic treatment in order to retract forward-migrating upper incisors, and in the cases of chronic periodontitis, the treatment was aimed at relieving overcrowding, improving alinement, closing spaces which had permitted food impaction, opening up spaces thus returning stress to the long axes of the teeth and inserting bridges, and the elimination of premature contacts and traumatic relationships.

Treatment lasted for periods varying from as little as one month to a year and a half, 12 cases requiring 6 months or less, and the remainder, with 2 exceptions, being completed well within a year. The simple movement over the bite of an individual tooth was naturally the least time-consuming procedure, and was completed in 1 or 2 (at most 3) months. Visits for adjustment of appliances were made at intervals of 2 or 3 weeks.

In some cases a means of retention had to be provided following the orthodontic treatment, either as a temporary measure or permanently. Twelve cases out of the 20 studied required retention; of these 9 were permanent in nature, and 3 temporary.

Removable metal retainers of chrome-cobalt steel were usually employed, but in 1 case the retainer was incorporated in a partial denture, in 1 it also acted as a splint, and 1 retainer consisted of soldered gold inlays. In the 2 cases where temporary retention was required, the retainers were worn for 4 and 6 months.

Fig. 1.—*Case* 1. Before orthodontic treatment.

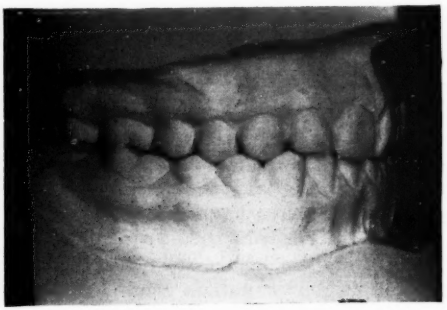

Fig. 2.—*Case* 1. After orthodontic treatment.

The orthodontic results were classified as "very satisfactory" when the teeth were moved into alinement and were in normal occlusion, as "fairly satisfactory" when they were not in normal occlusion but could do no more harm to the periodontium, and as "unsatisfactory" if the malocclusion persisted and was still aggravating the periodontal destruction. Ten of our cases fell in the first category, 8 in the second, and 2 in the third. From the point of view of the periodontal condition, this was assessed as:—

	Cases
Completely cured	8
Controlled	12

It was noteworthy that many patients were delighted with the improved appearance of the teeth, and in 2 cases a marked psychological change for the better was apparent.

CASE REPORTS

Case 1.—Mrs. M. P., aged 24, was referred to the Department of Periodontology on account of premature contact on upper and lower right canines, causing deviation of mandible to the right, resulting in a "cross-bite" on the right side (*Fig.* 1). Radiographically, there was a widening of the periodontal space of the lower right first molar, considered to be the result of traumatic

occlusion on this tooth. The patient had been treated for one year for malocclusion with removable appliances at the age of ten. Her periodontal disturbance was very mild and was diagnosed as chronic marginal gingivitis. Only orthodontic treatment was considered necessary, as malocclusion was the main aetiological factor. The treatment planned was to move $\overline{8\text{-}3|}$ lingually and expand the upper arch. The appliances used were removable and of acrylic. Five months after insertion, $\overline{8\text{-}3|}$ had moved lingually nearly to their right positions, and the premature contact between $\frac{3|}{3|}$ had disappeared. The expansion of the upper arch was completed 8 months later. The total time for treatment was 13 months, and a temporary removable retainer was worn for another 3 months. The result of orthodontic treatment was classified as fairly satisfactory (*Fig.* 2).

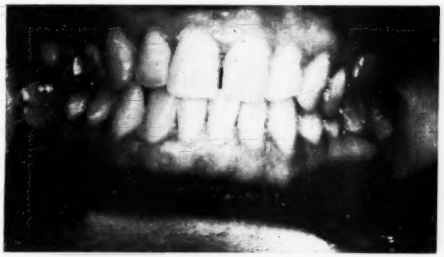

Fig. 3.—*Case* 2. Before orthodontic treatment.

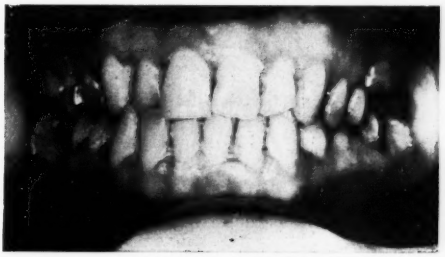

Fig. 4.—*Case* 2. After orthodontic treatment.

After the completion of orthodontic treatment, the patient's periodontal condition returned to a normal healthy stage by itself without any form of periodontal therapy.

This case illustrates the role of orthodontics in the treatment of mild gingivitis caused by malocclusion, but far more important is its role in the prevention of a more severe periodontal or temporomandibular joint disturbance.

Case 2.—Miss M. S., 27 years of age, came to this hospital because of "sore gums"; the diagnosis was chronic ulcerative gingivitis. The maximal severity of the disease was confined to the $\underline{21|1}$ area. The upper right lateral incisor was in linguo-version and locked behind the lower anterior teeth (*Fig.* 3). The periodontal treatment consisted of penicillin chewing-gum for two days, then oral prophylaxis and gingivectomy. The result of this treatment was very satisfactory, but since, according to the patient's history, the disease recurred intermittently and always began in $\underline{21|1}$ area, this area was considered as a primary site of involvement, and orthodontic treatment to move upper right lateral incisor into alinement was indicated. A removable orthodontic appliance was used and the tooth moved into its proper position in $3\frac{1}{2}$ months, and was retained by a removable retainer for another 4 months. The result of orthodontic treatment was very satisfactory (*Fig.* 4). Two years have passed since the completion of orthodontic treatment without any recurrence of ulcerative gingivitis and the disease is considered as completely cured.

This case demonstrates malocclusion as a main cause in the formation of primary site of recurrence of ulcerative gingivitis. Without an orthodontic procedure, the prevention of recurrence may not be possible.

SUMMARY AND CONCLUSION

1. For successful periodontal treatment, orthodontic procedures should always be considered, in patients with malocclusion, provided such procedures are practicable.

2. The periodontal condition of the patient should be restored to health before the beginning of orthodontic treatment.

3. It is easier and less time-consuming to move teeth if some loss of supporting bone has taken place.

4. The occlusion should be examined after the orthodontic treatment is completed, whether or not the patient has any periodontal diseases, and selective grinding carried out if necessary.

5. An analysis of the results of orthodontic-periodontal treatment in 20 patients, together with 2 case reports, is presented.

The authors would like to express their thanks to the staff of the Orthodontic Department, Eastman Dental Hospital, for their co-operation and treatment, and to the Photographic Department for the photographs of cases.

REFERENCES

COLEMAN, R. E. (1948), *Amer. J. Orthodont.*, **34**, 791.

DUMMETT, C. O. (1951), *J. Periodont.*, **22**, 34.

GLICKMAN, IRVING (1953), *Clinical Periodontology*. Philadelphia: Saunders.

SCOPP, I. W., and BIEN, S. M. (1952), *J. Periodont.*, **23**, 135.

SHAPIRO, M. (1956), *Ibid.*, **27**, 7.

LETTERS TO THE EDITOR

The Temporomandibular Joint

June 28, 1957

Dear Sir,

After twenty years of confusion it seems that we have now shaken off the fantasy and the incautious enthusiasm which, especially in American literature, characterized many earlier discussions of this subject.

Mr. H. E. Wilson's article in the April issue of THE DENTAL PRACTITIONER happily confirms that impression. He avoids any reference to Costen. Eschewing pseudo-scientific jargon he speaks in simple language of what he knows at first hand, and he supports his opinions with clinical evidence in the form of clear photographs and tracings. It is pleasing also that he deals with the correction of temporomandibular dysfunction in children, that is, before degenerative changes have become irreversible—as they so often do in adults.

Yet, in one simple but important respect the literature of this subject still lacks clarity. I refer to the tendency to discuss and illustrate abnormal relations of a condyle to its fossa (retropositions, displacements, and the like) without first defining a normal condyle-fossa relation.

Elsewhere (*J. dent. Res.* (1953), **32**, 302) I have attempted such a definition based on radiographic examination of a number of young adults. Suffice it to say that, allowing for a range in biological norms, I believe a normal relation of a condyle to its fossa to be one of approximate symmetry. Until we agree on this or some other criterion of normality we cannot begin to talk about abnormal relations with any chance of precise understanding, much less of agreement. For example, if a writer believes that in a normal relation to its fossa a condyle is poised half-way down the articular slope, he will describe as posteriorly displaced or retroposed a condyle which to me is in normal relation with its fossa. On such a basis one can discover almost as many retroposed condyles as one hopes to find.

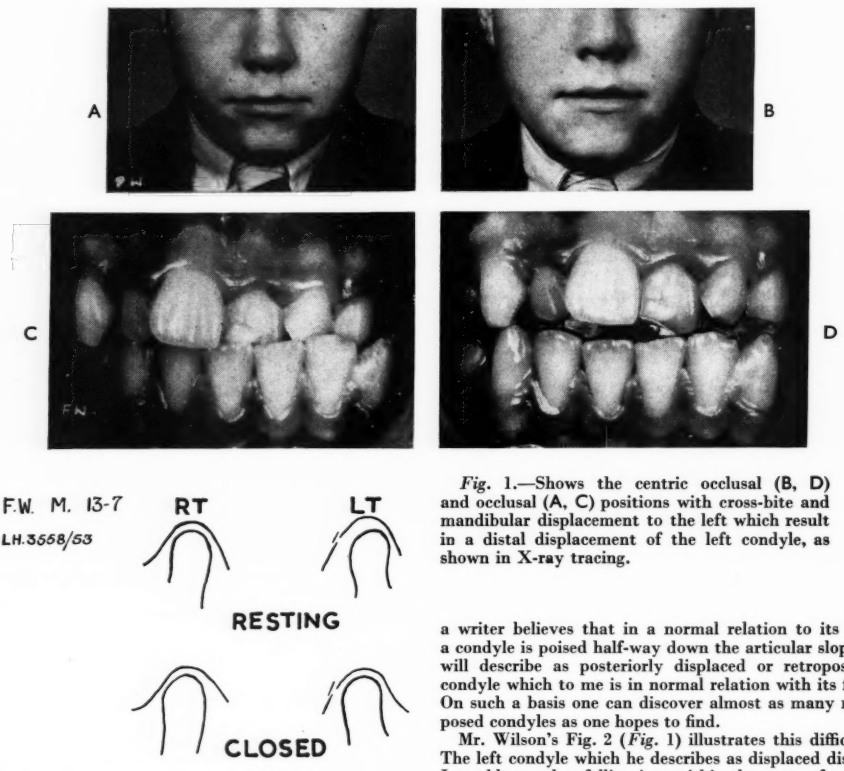

Fig. 1.—Shows the centric occlusal (B, D) and occlusal (A, C) positions with cross-bite and mandibular displacement to the left which result in a distal displacement of the left condyle, as shown in X-ray tracing.

Mr. Wilson's Fig. 2 (*Fig.* 1) illustrates this difficulty. The left condyle which he describes as displaced distally I would regard as falling just within the range of normal relations. And he does not comment on something which I believe to be important: his tracing shows that the right condyle has moved forward. When a left lateral mandibular deflection is observed clinically, it is easy to infer that the left condyle has suffered a backward displacement; whereas it is equally or more probable that the left condyle remains in its original position while the right condyle suffers forward displacement.

Similarly with Mr. Wilson's tracings in Fig. 5 (*Fig.* 2). Although I can well believe that his treatment has relieved symptoms, what he describes as backward (bilateral) mandibular displacement does not have that

appearance beyond all doubt. On the contrary the condyles in three of the four tracings appear in normal relation at the commencement of treatment but grossly protruded at the conclusion. In the same tracings one can detect another change which would cause me concern: Treatment has produced a considerable discrepancy

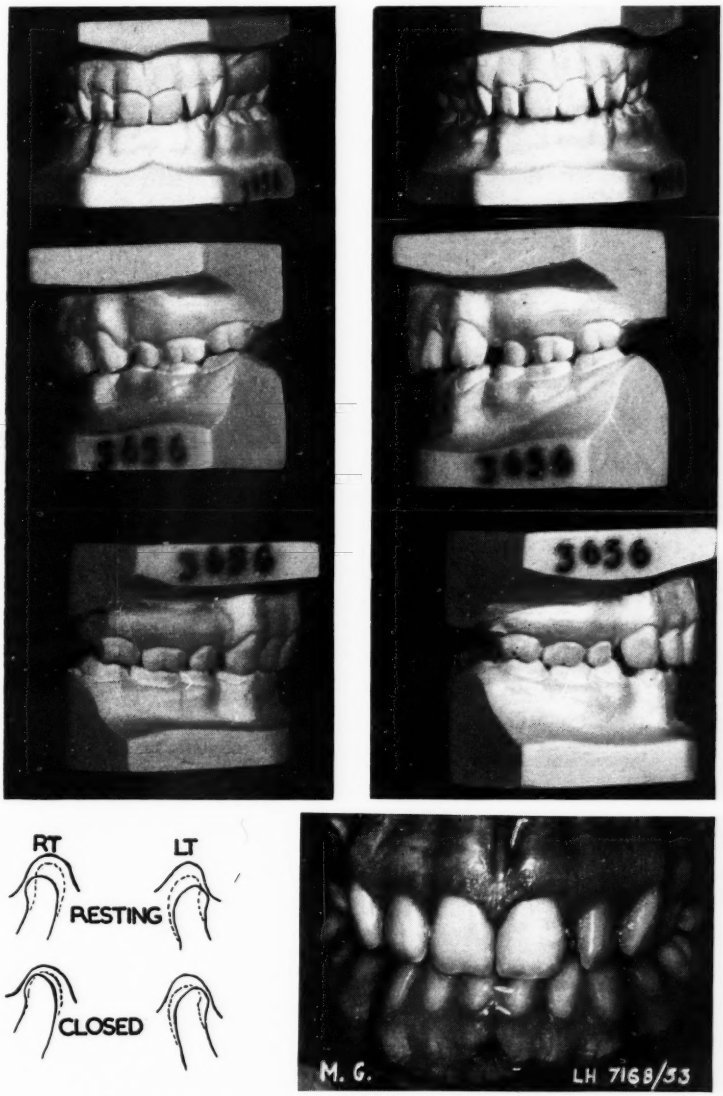

Fig. 2.—Extraction of four first premolars for orthodontic treatment resulted in deep overbite and backward mandibular displacement with joint symptoms. Treated with a removable appliance. Models show progress of treatment with change in arch relationship and correction of deep overbite. Joint tracings show the position of the condyles in the resting and closed positions before (broken line) and after (continuous line) treatment. Intra-oral photograph shows the result one year later.

between resting and occlusal positions and hence an increased translatory movement of both condyles in passing from resting to occlusal positions. Clinical observation leads me to believe that patients having extensive translatory (as distinct from rotary) condylar movements are particularly liable to temporomandibular dysfunction.

But to return to terminology, it is evident that further progress in our discussions of the temporomandibular joint awaits somewhat urgently an agreement on what constitutes a normal condyle–fossa relation. In the meantime would it serve most of our purposes if we reserved the terms "backward displacement" and "retroposition" for those rare cases in which the condyle comes close to impingement on the posterior wall of the glenoid fossa? We could then describe those more numerous patients in whom resting and occlusal relations are simply discrepant as exhibiting translatory movement between the two positions. The amount of translation could be expressed in millimetres. We would then run no risk of implying more than we intended.

I am grateful for Mr. Wilson's co-operation in the publication of this comment and for his generosity in permitting the reproduction of his original Figs. 2 and 5.

Yours faithfully,

F. W. CRADDOCK.

University of Otogo Dental School,
Dunedin,
New Zealand.

July 16, 1957

Dear Sir,

I am pleased to have this opportunity to reply to Professor Craddock who has honoured me by reading my article and offering some very helpful and constructive criticism.

It is assumed that the "normal" is understood by most readers interested in the subject and unless the normal discussed is different from or new to the general conception, then definition is unnecessary. Normals in all things biological have innumerable variations and the mean of a group of "normal" individuals (later referred to as "mean normal") is not necessarily normal for all types. Nevertheless, it is a useful and necessary guide but must only be used as such.

Temporomandibular joints have a wide variation and any definition of the normal must, therefore, be loose. In the individual the normal may be at the extreme range of the normal variation. The normal for the individual is the condyle–fossa relationship when the mandible is in the resting position. Thompson's conception of the behaviour of the condyle during mandibular movement is used not because it is necessarily accepted in its entirety but because it serves our purpose as a starting point. For practical purposes the comparison of the condyle in the various positions is more reliable than comparing it with a mean normal. Definition of normal which may have no relation to the individual is of little use if it is not to be used in the diagnosis.

X-rays are used only to supplement the clinical examination. A standardized X-ray technique does not allow for variations between individuals in the angle of the condylar axis to the three planes. It is essential to be aware of this possible variation which reduces the reliability of X-rays as a diagnostic aid. Symptoms are present when there is little or no displacement of the condyles demonstrable on X-rays and gross displacements are often symptomless. Measurement of this displacement could give no indication of the need for treatment nor the severity of the symptom. Metric differences between the individual condylar position and the mean normal is even less useful.

Another error is the registration and recording of the resting position and I am aware that the tracing in *Fig.* 2 [Fig. 5 in the original article] may be an example where this error is present. Nevertheless, the illustration serves its purpose in this article.

That excessive translatory condylar movements are particularly liable to dysfunction is not my experience. The severe symptoms are often associated with reduced condylar movements. I would not be dogmatic as to which type has the higher incidence or produces the more severe symptoms.

In lateral displacement it is true that one condyle may be displaced backward and the other forward or a combination of both, which is mentioned in the text although not specifically in relation to *Fig.* 1 [Fig. 2 in the original article]. The *important* fact is the backward displacement with which the symptoms are usually associated: forward displacements are usually symptomless. The type of condylar displacement in a particular case of lateral mandibular displacement is decided by the occlusion.

I agree with Professor Craddock that a precise definition of normal would assist the understanding of the abnormal temporomandibular joints, but so far no definition precise enough to be used in all clinical cases as a standard and which improves on Thompson's has been made.

Yours faithfully,

H. E. WILSON.

6, *Upper Wimpole Street,*
*London, W.*1.

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A brief discussion of the pharmacology of these drugs, together with dosage tables, is given, and the technique of administration and subsequent treatment is discussed.—BUCKMAN, N. (1956), *J. Dent. Child.*, **23**, 141.

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VOLUME VII, Nos. 1—12 (SEPTEMBER, 1956—AUGUST, 1957)

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and

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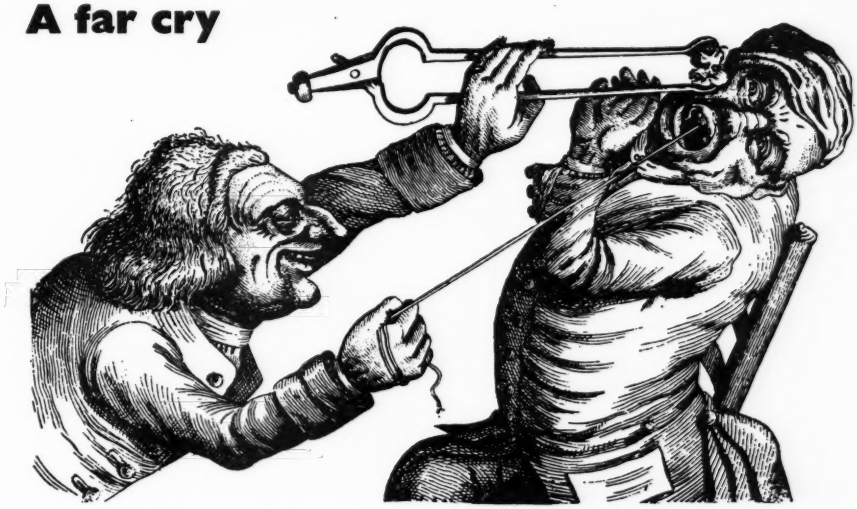

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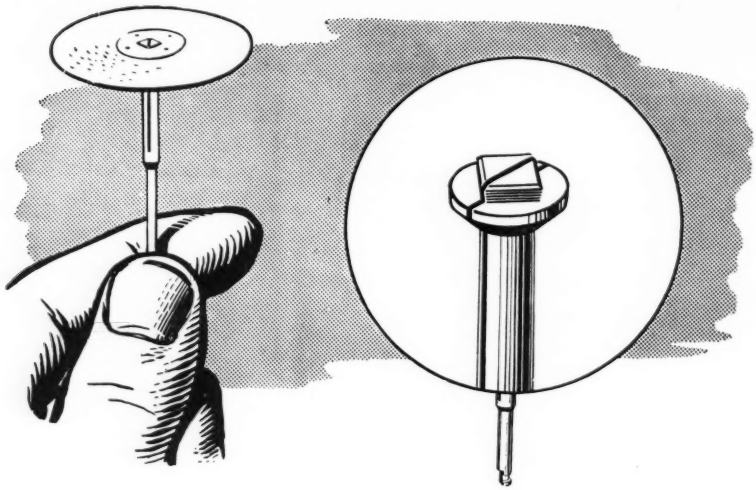

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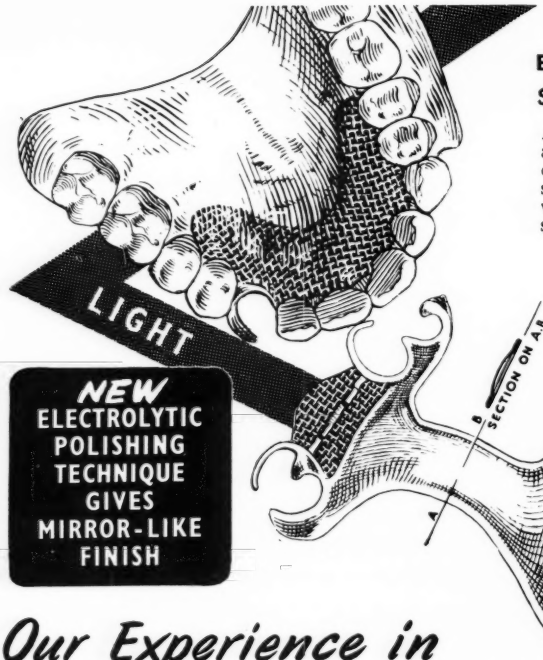

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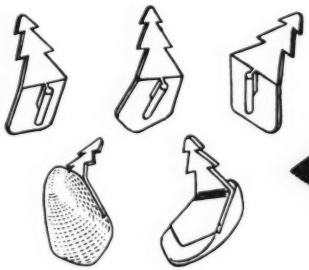

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References. 1. Gale, J. A., Dent. Record, 71, 15, 1951. 2. Henschel, C. J. and Lieber, L., Oral Surg. Oral Med. and Oral Path., 5, 155, 1952. 5. Lefkowitz, W. and Venti, V. I., Oral Surg. Oral Med. and Oral Path., 4, 1576, 1951.

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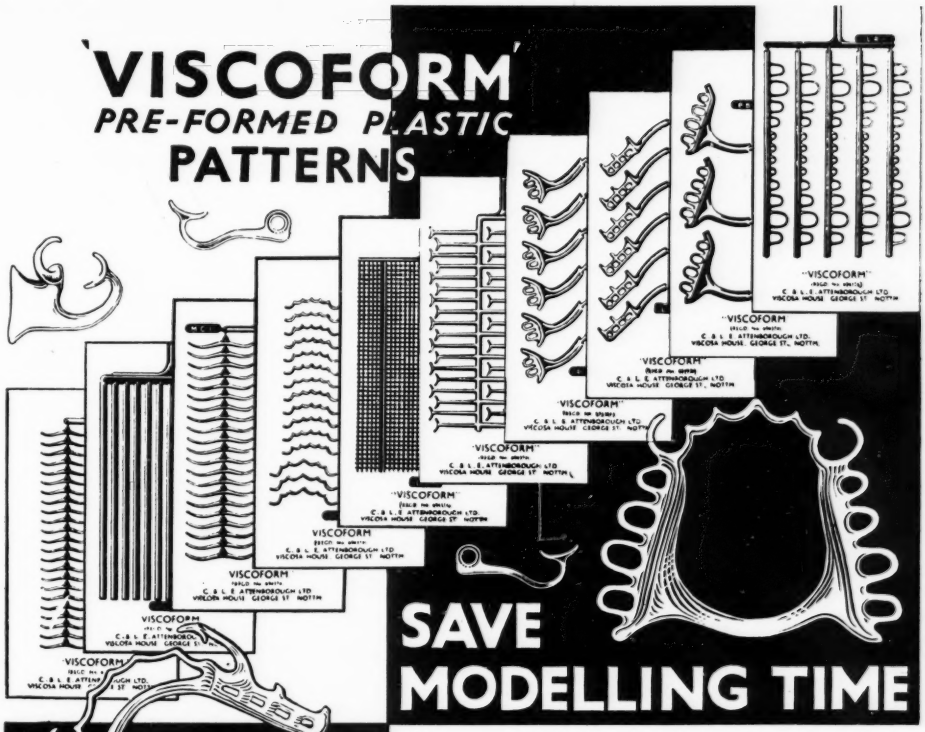

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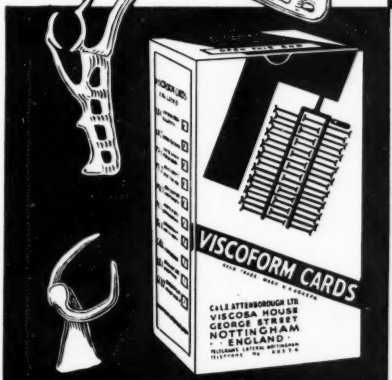

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